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Scientific Management and Labor

By JOHN P. FREY,
Editor International Molders' Journal.

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Scientific Management and Labor.

By John P. Frey,

Editor International Molders' Journal.

A FEW years ago there was introduced in several industrial establishments a system of management which was radically different in many of its features from any that had preceded it, and which its advocates announced was revolutionary in its results. The system was called "Scientific Management."

Claiming that the system had been developed as the result of thoroughgoing and scientific research and investigation by highly trained industrial and mechanical experts, its advocates held that when applied to industry it would eliminate economic waste by systematizing and standardizing the elements of production. It was asserted that it would make the workers more efficient through the special instructions and training it provided for, that it would safeguard them from injustice and the arbitrariness of employers and foremen, protect them from over-exertion and provide for higher wages than had previously been paid, and furthermore that it would eliminate industrial strife.

Owing to its application in part in Government arsenals, and a strike by the union molders against some of its features as they were introduced in the foundry at the Watertown Arsenal, "Scientific Management" received much publicity.

The House of Representatives appointed a committee, consisting of Congressman William B. Wilson, William C. Redfield and John Q. Tilson to investigate the system as it had been applied in the Watertown Arsenal. In its report to Congress this committee sustained labor's contention that the system forced abnormally high speed upon workmen, that its disciplinary features were arbitrary and harsh, and that the use of a stop watch and the payment of a bonus were injurious to the workers' manhood and welfare. At a succeeding session of Congress a measure was passed which prohibited the further use of the stop watch and the payment of a premium or bonus to workmen in Government establishments.

When the Federal Commission on Industrial Relations began its work it was decided that a further investigation of "Scientific Management" should be made, and Mr. Robert F. Hoxie, Professor of Economics at the University of Chicago, was selected to undertake the work. The commission was fortunate in securing a man of Mr. Hoxie's caliber and training. For many years he had made a specialty of industrial problems, and was familiar through personal contact and association with the viewpoint, mental attitude and ideals of employers and workmen, organized and unorganized. Throughout the investigation he was treading on familiar ground, insofar as the principal problems which have arisen in our industries between the workers and the employers were concerned.

Mr. Hoxie was to devote a year to his investigation, and, as a part of this was to include a personal examination of a number of industrial plants which had applied the methods and principles of "Scientific Management," it was deemed advisable that he should be accompanied by two men whose training qualified them to act as expert assistants in calling attention to the actual conditions which would be encountered in these establishments, and their implications.

One of those appointed was Mr. Robert G. Valentine, ex-Indian Commissioner, and by profession an industrial counsellor, who, during recent years, had devoted most of his time to the development of the personnel features in large establishments. The

question of Mr. Valentine's selection was referred to some of the leaders of "Scientific Management" before his appointment was confirmed by the Commission on Industrial Relations.

The other expert was to be a trade-unionist, and I was honored with the appointment.

The report which Mr. Hoxie submitted to the Commission on Industrial Relations was prepared after some thirty-five industrial establishments had been investigated, and interviews had been held with a much larger number of individuals connected with the management side, including such leaders of the "Scientific Management" systems as Mr. Frederick W. Taylor, Mr. Harrington Emerson and Mr. H. L. Gantt. Workers, organized and unorganized, and trade union officials were also questioned.

In connection with this report it should be said that from the day that the Chief Investigator and his two assistants met to take up the field work there were daily conferences whenever they had jointly visited a plant, at which all information secured was discussed, and an earnest effort made to give the proper weight and value to the sometimes conflicting statements of workers and employers which were secured in the establishments investigated.

The investigators were impressed with the conviction that their work was not to compare one theory of management with another, or to investigate the theoretical postulates of "Scientific Management," but rather to discover the actual conditions affecting labor which existed in industrial establishments where the "System" was being applied and in operation. It was an investigation of "Scientific Management" as it affected labor directly and indirectly.

The report which was finally prepared by Mr. Hoxie, after consultation with his two assistants, was subjected to their criticisms and suggestions, until finally a common agreement was reached, so that when it was presented to the Commission on Industrial Relations it had attached the signatures of the three, who were in agreement with its contents.

It is necessary, before referring to the facts which were developed by the investigation, to indicate the preliminary work which was done by Mr. Hoxie previous to the field investigations, for the lines along which the investigation was carried on were determined almost wholly by the results of this preliminary determination of the points upon which it was necessary to secure information.

From the day that "Scientific Management" was given publicity, positive claims as to its great value to labor were made by its advocates, while as emphatic charges that its methods and practices were injurious to the workers were made by trade unionists. Some of these statements were contained in books, magazine articles and public addresses, while many of them were incorporated in the Congressional hearings which had been held, and the testimony given before the Commission on Industrial Relations in the early part of 1914.

These records were examined and from them approximately one hundred separate features of "Scientific Management" were secured, which its leading advocates claimed were beneficial to labor. Practically an equal number of separate charges were made by trade unionists against the system. This examination of the record, supplemented by personal interviews with leaders of both groups, supplied two lists, one containing the labor claims of "Scientific Management" and the other the charges against it made by the trade unions.

Such lists, however, were liable to have their accuracy challenged, and to prevent such an issue from being raised afterwards they were submitted to high authority for revision and correction.

The list of the labor claims of "Scientific Management" was submitted to

Mr. Frederick W. Taylor, Mr. Harrington Emerson and Mr. H. L. Gantt and others, and as the Taylor and Emerson systems differ in some respects their respective modifications or statements were separately recorded. The final result, however, was a list of the labor claims of "Scientific Management" which had the stamp of accuracy and completeness placed upon it by the recognized leaders of the cult.

The list of labor's charges against "Scientific Management" was brought to the attention of the Executive Council of the American Federation of Labor by Mr. Hoxie during the Philadelphia Convention of that organization in 1914, with the request that a committee should be appointed to examine the list, with the object of making such modifications, additions or corrections as would be necessary to have it embody the trade union viewpoint. A committee was appointed for this purpose, and afterwards the list of labor's charges was carefully gone over by President Gompers, First Vice President Duncan and Secretary Morrison. This list contained some charges which had been made by individuals, with perhaps insufficient evidence to prove their accuracy, but inasmuch as they had been made publicly they were allowed to stand.

There were, therefore, two lists of statements, both of which had been given the highest endorsement as to their accuracy which it was possible to obtain. With these two lists before him Mr. Hoxie prepared a list of the vital points of difference between them.

It was apparent that if the facts were to be acquired, detailed instead of general information would have to be secured, and that this might be systematically gathered a questionnaire was prepared, containing approximately seven hundred questions, the great majority so framed as to call for detailed information, and few permitting of a simple affirmative or negative answer. The questionnaire formed the foundation of the investigation, this being supplemented by the material gathered through personal investigations of plants where production under "Scientific Management" was being carried on.

Mr. Valentine and I assisted Mr. Hoxie in the final revision of the questionnaire, and when this had left the printer's hand the field work was undertaken, with the object of securing such evidence as could be found which would justify either the labor claims made for "Scientific Management" or the charges made against it.

The plants where the investigations were made were representative establishments or those recommended or suggested by Mr. Taylor, Mr. Gantt or Mr. Emerson as those in which the standard methods of "Scientific Management" had been applied. These shops, therefore, afforded the most satisfactory field for studying "Scientific Management" at its best which could be secured. The plants visited covered a wide range of production, from cloth weaving, garment making and the manufacture of large machinery to printing establishments, shops operated largely by semi-automatic and automatic machinery, departments where hand labor rather than machinery was required, and a Government Arsenal.

The term "Scientific Management" was originally applied to the system of shop management which had been developed by Mr. Frederick W. Taylor. At present it is popularly used to designate any one of the several systems of shop management which embody in part certain of the prominent features which were first introduced by Mr. Taylor.

While all of the systems of "Scientific Management" have certain features in common, they also contain elements of difference, both as to their structure and the method of their application. It is, therefore, difficult to define "Scientific Management" in a manner which would satisfy all of the leaders of the several systems now in operation; for all general purposes it

may be said that the term designates any of the systems of shop management which claim to secure greater productive efficiency through the systematic standardization of the elements of production.

A common feature of these systems is the planning out of the work by specialists so that it may be most economically handled and routed through the shop, the grouping of machinery and its operation at full capacity, the time and motion study of all mechanical and manual movements, so that the machines' possibilities and the workers' manual capacity can be analyzed into their minute elements from which the task to be accomplished can be defined and fixed, and the stimulation of the worker through the payment of a bonus or premium, so that the task set will be accomplished.

The investigation which was made indicated that no plant had as yet applied all of the features of any of the systems to the establishment as a whole, and that practically every employer had made modifications of whatever part of the system had been introduced.

To illustrate the divergence found, the forms of wage payments may be taken. Originally there were three most prominently known, the premium, the task and bonus and the differential piece work. These may be termed basic forms, but some twenty-five or more variations of these were found to be in practice. Wide variations were also found in the manner of making time studies, and in the rules by which the worker's task was to be determined. It was also found that the same system, installed by the same efficiency engineer, would produce varying results in different plants, as far as the workers were concerned, each general manager modifying or altering the application of the system according to his temperament, viewpoint and his knowledge of the human problems created by modern industry.

The several systems of "Scientific Management" and their variations which were observed in actual operation were installed by efficiency experts or managers, whose names are prominent in the "Scientific Management" group, and no time was devoted to an examination of shops where "systems" had been installed by any of the charlatans and fakers who, during recent years, have reaped a rich harvest, owing to the employers' avariciousness or credulity. We were informed by the leaders in the established "Scientific Management" group that the number of charlatans and imposters far outnumbered those who were truly qualified as efficiency engineers and had secured a recognized standing among business men. These quacks, they held, were largely responsible for much of the disrepute in which "Scientific Management" is held by many employers and workers. Referring to them one eminent efficiency engineer said:

"At the present time there is a great dearth of men who are qualified by experience, training and temperament to establish in industry the principles of 'Scientific Management' and to develop a proper mechanism for the application of these principles. There are also some of these men who are perfectly sincere and honest in their efforts and do not realize their shortcomings or lack of qualifications. Others have regarded so-called efficiency engineering as a means of earning an easier living and making more money than they would otherwise be able to do in other fields."

Another equally as well known efficiency engineer said:

"One trouble is that there are a large number of fakers installing systems under the guise of 'Scientific Management' and it is because of what they have done that workmen have just cause for complaint."

One expert informed us that "there were more fake engineers in 'Scientific Management' than in any other line," while one of the most prominent leaders said that the reason the competent efficiency experts had not succeeded in exposing all of the fakers and imposters was that these quacks outnumbered them five to one.

No effort was made to discover how many fakers there were professing to introduce "Scientific Management," but from the statements made to us it would seem that there are a large number. Upon this subject the Hoxie report says:

"'Scientific Management' as a movement is cursed with fakers. The great rewards which a few leaders in the movement have secured for their services have brought into the field a crowd of industrial patent medicine men. The way is open to all. No standards or requirements, private or public, have been developed by the application of which the goats can be separated from the sheep. Employers have thus far proved credulous. Almost any one can show the average manufacturing concern where it can make some improvements in its methods. So the 'Scientific Management' shingles have gone up all over the country, the fakers have gone into the shops, and in the name of 'Scientific Management' have reaped temporary gains to the detriment of the real article, the employers and the workers.

Just who these fake 'Scientific Management' experts and time study men are it is impossible to tell, since no recognized standards of judgment exist. Accusations, indeed, are plentiful, but your investigator would not be warranted in repeating these. What proportion of the numerous failures of so-called 'Scientific Management,' of the positive errors and evils of time study, task setting and rate making in shops under this name are due to the work of these fakers is another matter on which no judgment can be passed, though scientific managers have variously estimated the fakers as four out of five, or nine out of ten. The certainty is that this element exists; that its representatives apparently cannot be clearly distinguished and set off under existing circumstances from the more legitimate 'Scientific Management' practitioners; that the legitimate 'Scientific Management' group seems powerless to eliminate or control it; and that it exposes employers and workers to the losses and injustices of crude and inaccurate industrial tinkering—all in the name of 'Scientific Management' and under the protection of its promises and claims."

The quacks' work, however, was not investigated. The facts which were gathered, the impressions which were secured, and the tendencies which were observed were all acquired through the investigation of plants in which "Scientific Management" had been introduced by well known efficiency experts or managers.

The methods of introducing the systems varied according to the men, some going about their work in a diplomatic manner, others jamming it through with apparently little, if any, regard for the workers.

The president of one of the largest establishments told us that ————'s system of "Scientific Management" was without human element, and that the trade unionists were not to be blamed for fighting it because of the language which he had used in connection with labor.

"If," he said, "I had introduced 'Scientific Management' in the literal way in which ———— interprets it, I would have had a revolution on my hands, and the workmen would have been no good if they had not revolted."

From information secured it would appear that "Scientific Management" in its genesis gave but little, if any, consideration to the workers' rights and welfare, but confined itself closely to the problem of reducing the cost of production. When the system was first established it was largely applied to plants which had proved unprofitable through faulty management, with the purpose of again making them profit-making concerns, the efficiency engineer having charge of its introduction receiving his recompense only after the plants were able to again pay dividends.

It would seem that the workers' welfare and his status as a human being, a mechanic and a citizen, did not receive much consideration until labor had rebelled against the system, and directed attention to many of its features which affected labor injuriously.

Time and Motion Studies.

"Time and motion study," said Mr. F. W. Taylor, "is the accurate, scien-

tific method by which the great mass of laws governing the best and easiest and most productive movements of men are investigated. These laws constitute a great code, which, for the first time in industry, completely controls the acts of the management as well as those of the workmen. They substitute exact knowledge for prejudiced opinion and force in determining all the conditions of work and pay."

Time and motion studies are made with the assistance of split second watches, which enable the time and motion study men to time all motions, and from the analysis of the records thus secured and the study of the motions, to determine the time in which the work should be performed and the motions by which this is to be done. These studies are also made for the purpose of determining the most economical manner of doing the work.

Many of these time studies are exceedingly minute, some of the workmen's instruction cards showing as small an allowance as one hundredth of a minute for the performance of a part of the work, and make such fine distinctions as the allowance of two hundredths of a minute for laying down a wrench, while three hundredths are allowed for picking it up, as shown in the reproduction given from an instruction card for operation.

INSTRUCTION CARD FOR OPERATION.

	Time allowed in hundredths of a minute.
Put piece on arbor	.15
Pick up wrench	.03
Tighten expansion arbor	.15
Lay down wrench	.02
Run carriage up and set pointer at O	.16
Put tool in post and set in center of pulley	.79
Put piece on stud and fasten	.24
Start machine	.02
Set tool for turning and throw in feed	.18
Turn outside dia. 2″ run	1.64
Throw out feed	.01
Face inside and outside dia. of flange	.82
Stop machine	.14

Much has been said about the scientific accuracy of time studies, for the efficiency engineers realized that, unless the stamp of accuracy was placed upon time studies and the tasks for workers to perform which were set as a result, the scientific character of their theory, and its results when applied, would be successfully challenged.

At the beginning of the investigation it was apparent that scientific accuracy in the timing of work and the setting of a task was an impossibility, owing to the large amount of judgment which was required on the time study men's part. The number of time studies to be made on a job before the task was set were determined by the time study man, with no other rule to guide him but his judgment. His judgment also determined how many of the workers should be studied in connection with a job, the type of workers to be selected, that is, whether slow, average or speedy, whether they were working normally while he was timing them, and the allowances he would make for fatigue and the other human factors. When these elementary time studies were analyzed it was the time study man's judgment which determined how many of the longest or shortest times would be thrown out, and the groups of times to be selected from which to strike an average, or whether the minimum times should be the ones chosen. In almost every establishment a different basis or rule for determining the times to be selected, from which the task would be determined, was found to be in operation. One time study man who was asked why he followed a certain rule in analyzing his time studies, naively informed us that he did not know how the rule was determined, but he 'guessed that the rule had been constructed so as to get the results which its inventor wanted.'

As the Hoxie report contains a thorough examination and analysis of the time and motion study methods found in operation, no effort will be made to go deeply into the question. Some of

the conditions which were encountered, however, will be related.

Workers were found who expressed no objection to having time studies made on them, while others were strongly opposed to having a man stand over them with a split second watch in his hand.

In one plant, where time studies were being made for our benefit, it was found that there were wide variations as well as apparent errors in the figures which the time study man had entered upon his elementary time sheet. Upon his attention being called to this he said: "I generally come much closer to the average figures, but I knew that you were watching me while I was making the study and it made me nervous." The same man had previously assured us that it did not make the workmen nervous when he was making time studies of their work.

As was the case with many other features of "Scientific Management," it was found that the results of time and motion studies varied widely in different establishments, and that other factors aside from the records secured by time and motion studies influenced the task setter in making the task easy or difficult of accomplishment.

At one plant in which the tasks were set by one of the most widely known efficiency engineers it was found that he had set these so liberally in one of the departments that the workers were earning more than the firm was willing they should, with the result that some time after the engineer had finished the installation of his system in some of the other departments the firm refused to allow the system to continue, and returned to the former methods of regulating the day's work and day's pay. This resulted in a lowering of the earnings to their former level in the department referred to, and a strike was narrowly averted.

At another plant, where a most prominent efficiency engineer had introduced parts of the system and set the tasks, it was found that he had set them so high, had made them so difficult of achievement, that the workers could not accomplish them. It became necessary to revise all of these tasks and liberalize them in order to retain their employes.

Another establishment afforded an insight into some of the motives which entered into the setting of the tasks, making them difficult or easy of accomplishment.

The plant was a large one, with many departments, covering in some cases work largely of a similar character. In the one which had been placed under "Scientific Management" the task and bonus system of payment prevailed, while in another which had not been time-studied and standardized the old-fashioned piece rate system prevailed. This plant had been frequently referred to by others as an example of the benefits of "Scientific Management" to the workers, for it was claimed that under the piece work system the workers worked harder and received less wages than in the department where "Scientific Management" had been installed. Our investigation proved this to be a fact, for unquestionably the workers in the "Scientific Management" department were working with less evidence of feverish haste than in the piece work department, and their earnings were greater.

A careful investigation, however, indicated that these surface indications were misleading. When the corporation determined to install "Scientific Management" in this particular plant they were informed by the efficiency engineer that there was a strong prejudice against the system among the workers, which it would be necessary to overcome before it could be successfully installed in all of the departments.

As a first step he increased the hourly rate two cents in this department, installing with it a task and bonus system, which when the task was accomplished gave the workers about a twenty per cent addition to their hourly wage rate. The tasks were so set that

practically every worker could accomplish them without undue exertion, the result being that at the time we visited the plant, they were working more easily and receiving higher earnings than the piece workers. We found, however, that the cost of production in this department was higher than in the piece work departments, and that this was the principal reason why it had not been installed in them.

This was an instance where the workers wanted "Scientific Management," preferring it to day or piece work, and under these circumstances it was not surprising.

There remains another condition in connection with this situation which must be referred to. Within a few miles the same corporation had another large plant, and here the manager, using such information as could be secured relative to the mechanisms of "Scientific Management," was installing the system. Here, however, none of the tasks were easy of accomplishment, and no advance in the hourly wage was being given. The workers were rebelling against the conditions being forced upon them, while the superintendent of the department where the system had first been installed complained of what the manager in the other plant was doing, saying that it looked as though he was trying to show him up.

Under such circumstances, and with one manager pitted against another, it is evident that something far stronger than the fair promises and assurances of "Scientific Management" must be at the workers' disposal to protect them from abuses, speeding up and poor pay.

In practice it was frequently found that where more than one job was given to a worker the task set, or the standard of achievement, was much more difficult of accomplishment in some cases than in others. If the tasks were set with scientific accuracy it would be expected that the normally competent worker would achieve the task approximately one hundred per cent of the time, or to use the technical language of "Scientific Management," "that this efficiency in accomplishing his work would be one hundred per cent." If the recorded efficiency of individual workers on various jobs indicated a wide variation, then it is but natural to assume that the variations were due to the inaccuracies of the task time set for the several jobs.

An interesting and most valuable analysis of variations of output by the same workmen under "Scientific Management" has been made by Mr. Miner Chipman, and we give the following figures from the study which he made of the conditions existing at the Watertown Arsenal after the system had been introduced.

The analysis of the men's output or so-called efficiency covered a period of one month, which makes it well representative of the unevenness with which the tasks had been set.

For the month of March, 1914, Employe No. 2518 worked on 224 jobs. His average efficiency was 121.35%, but his efficiency on these jobs varied from 21% to 200%.

In September, 1913, Employe No. 2681 worked on 91 jobs. His average efficiency was 96%, but his efficiency on the several jobs varied from 39.3% to 149%.

Employe No. 2518 worked on 140 jobs during April, 1914. He was a most competent workman, as his average efficiency for the month was 121%. His efficiency on the several jobs ranged from 45% to 172.9%, these variations indicating largely the too short or too long time which had been set on the jobs by the time study and task setting man.

Commenting on these figures, Mr. Chipman said in his report:

"Mr. Taylor, in his 'Shop Management,' emphasizes 'that this system rests upon an accurate and scientific study of unit times,' which is by far the most important element in 'Scientific Management.' He also says that time studies made by this method determine with

scientific accuracy 'the quickest time that can be made by a first-class man' and to the effect that this 'quickest time' or 'standard times' is so set that it cannot be bettered.

What can be thought of the times set on these jobs, when this workman on the 224 jobs of one month showed a range of efficiency (efficiency being the ratio of time taken to time allowed) from 21% to 200%, with an average of 121%, and the following month on 140 jobs a range of from 45% to 173%, also with an average of 121%?

This workman may be rated as consistently of high efficiency. Why then this extreme variation in efficiency unless the time allowed for each job was not set accurately and scientifically? Can we assume that the worker varied in efficiency to the extent shown by the chart? We do not believe so. The variation is one of time setting or inaccuracy of time study.

Of the 244 jobs in the first month the time on 13 jobs was correct, efficiency 100%; on the remaining 211 jobs the time varied 2.755 minutes, or 22.2% from a total standard time of 12.935 minutes.

A study of the various jobs indicates that the variations in efficiency are due in part to the time-study man and in part to changes in conditions affecting work."

On two jobs in the foundry examined by the writer a difference of two hours and thirty minutes had been set, though at the outmost there could not have been more than ten minutes difference in the time to make the molds, as the patterns were almost identical, and were made in the same flask, the only apparent difference being that a longer hub on one of the patterns required about two inches more sand in the drag.

An interesting case, through which the worker was forced to suffer because of the error made in setting the time for the task, occurred in one of the machine shops visited.

A machinist was given eight cross heads to finish, forty-four minutes being allowed for the finishing of each cross head. As this machinist took considerably more time he was punished for his failure to accomplish the task by being laid off for thirty days.

During this period a more careful investigation was made of the job, and it was afterwards given to another machinist, who received a rate three cents less per hour. The time allowed for the finishing of the task was increased 120%, and although the machinist working on the job had a rate three cents less per hour than the other it increased the cost of production 78%. The machinist who was disciplined, however, was not allowed anything for the unjust punishment which had been meted out.

It would be possible to go on almost indefinitely in submitting evidence to prove that the time set on jobs by time study men and task setters in shops where "Scientific Management" has been applied has been anything but scientifically accurate. While in theory it should have been, what the workers are directly interested in is what occurs when application of a theory is turned over to employers and placed in practice. It is the practice and not the theory which most vitally affects the workers.

While in theory the time allowed for the performance of a task or job is scientifically accurate, if it has been set as the result of time and motion studies, it was evident to the efficiency engineers that mistakes would be made, and that these would cause dissatisfaction among the workers.

To give them confidence that they would have no unfair advantage taken of them "Scientific Management" laid down a principle upon which it has placed the greatest emphasis. This is that once a time or standard had been set for the performance of labor it would not be changed no matter how favorable it might be to labor. This principle is iterated and reiterated throughout the literature of "Scientific Management."

As far as our investigations were able to discover this rule generally obtains in practice, though managers were found who repudiated it, holding that

when the task had been set too liberally the workers knew it, and that as all errors, particularly those which the workers are aware of, should be immediately acknowledged and corrected, it was unwise not to change the time on the job; in fact, that this was necessary if the firm's intelligence was to receive the workers' respect.

It should not be inferred, however, that once a too liberal time has been set on a job or task it remains thus forever. A slight change of the design, a subdivision of the operation, or some other minor change, readily gives opportunity for new time and motion studies, through which the error can be corrected.

Naturally, the question arises as to what follows when too short a time has been set. No comprehensive answer can be given, for neither trade unionism, nor any other manner of collecting the workers' grievances, exists in plants applying the system, with perhaps one exception.

In practice, when workers complain that insufficient time has been allowed on a piece of work, they are shown the sheets upon which the time study man has entered the split second watch records, and are told that here are figures which show what was done, and that no one can go behind these, or it is demonstrated to them that the task can be done in the time set by the time study man or by some selected workman.

In one establishment a time of five hours and twenty-four minutes had been set for the performance of a task. As it required something over thirty-eight hours to accomplish it, the responsibility for the error was left for the time study men and the planning room to fight out, but the question of what would happen if the error had been less glaring, and how often these errors were made was one which, if answered, would throw more light upon what occurs when the task set places too great a strain upon the worker without harassing him enough to cause open rebellion.

Apprenticeship.

"Scientific Management" makes no provision for apprenticeship. In one plant a definite apprenticeship system, which aimed to develop competent craftsmen, was in operation for a limited number of boys, but apparently this exception was due to one individual in the firm who still retained the conviction that thoroughly trained mechanics would still be required by the industries, at least for some years.

What was called an apprenticeship was in operation in a few of the plants, but the training being given was not for the development of craftsmen, but rather to instruct a few bright young men for positions in the directing staff.

Both in theory and in general practice "Scientific Management" abandons the method of apprenticeship for the purpose of craft and manual training, and endeavors to substitute in its place specialization and standardization.

Not only do many of the efficiency engineers hold that apprenticeship for the training of craftsmen is no longer necessary, as their system provides for production without all-round craftsmen, but in more than one instance the thought was brought out that training apprentices was expensive and did not bring practical results for the outlay of time and wages, that where a thoroughly trained mechanic was necessary it was advisable to go into the open market and secure craftsmen who had been trained in other plants.

An example of this viewpoint is supplied by the following statement, made to us by an expert in one of the plants:

"We cannot take a man under apprenticeship and let him do different things for four years, and then pay him $21.00 per week. We must put him on one job, and keep him on one job.

There are some boys and girls in the composing rooms, and I would like to teach them to become printers, keyboarders, proof readers, make-up men, stone men, and teach them two or three phases of the business, but I have the threat in the back of my head that at the end of four years I must make them earn $21.00 a week, and I can go at the

end of the four years and get a much better workman for the money, so I must keep them on one job."

Specialization and Standarization of Labor.

In referring to the specialization which occurs under "Scientific Management" and the forms of instructions for workers which exist, the Hoxie report says:

"Once within the shop, 'Scientific Management,' according to the claims made by Mr. Taylor, solves completely the vexing problem of the adaptation and adequate training of the workers. It sets 'each man to the highest task for which his physical and intellectual capacity fits him,' 'employs in the shop a corps of competent specialists whose duty it is to instruct and train the workers and to assist them whenever difficulties arise in connection with the work,' 'systematically transmits' to them 'all the traditional craft knowledge and skill which is being lost and destroyed under current industrial methods,' 'requires workmen to learn and to perform not one merely but several operations or tasks,' and 'educates and trains them mechanically as they were never trained before.' In short, it constitutes a 'practical system of vocational guidance and training,' making possible the 'mutual adaptation of the task and the worker,' and opening the way 'for all workmen to become 'first-class men.'"

After describing the conditions which were found in practice, the Hoxie report asserts that "The theoretical transmission to the workers 'of all the traditional craft knowledge which is being lost and destroyed under current industrial methods' amounts in practice to the transmission to the individual of the knowledge required for the particular narrow job."

In general the managers of shops where the system was in operation held that they preferred the one job or one machine man to the thoroughly trained mechanic. On more than one occasion, I asked the managers of machine shops the following question: "If you needed a machinist to operate a lathe and two men applied for the position, both of an equally promising appearance, but one only claiming to be a lathe hand, while the other claimed to be equally competent to operate a planer, and a boring mill, which would be hired?" The almost invariable answer was, "we would employ the man who could only operate a lathe, for he would be a specialist." This point of view was expressed by the manager of one large plant while explaining his attitude towards apprenticeship and specialization.

"Where you manufacture," he said, "you must specialize. We decidedly do not have the facilities here for making first-class all round mechanics. A specialist is of value to the company and we compensate him. There is so much more intensification in every field that we prefer a specialist to an all round mechanic."

Another manager of a large establishment said to us: "The worker under the present specialized system is as well off as under the old, but the old skilled workman is no longer required," and after a short pause he added, "the trouble is that the workers today are not as ambitious as they should be under the conditions."

What ambitions could be gratified by feeding the same shape of metal into a machine for days, weeks and months, or in screwing on nut 47 or 73 on an automobile with no opportunity of rising in the scale as a craftsman, must be left to a Münsterberg to discover.

In practice "Scientific Management" seeks continually to specialize and subdivide the work, so that the worker performs but a minute part of the work formerly done by a craftsman and required to complete a product.

In one of the foundries visited, five men were employed on various parts of the same small mold which formerly had been made in its entirety by one molder.

In a garment manufacturing establishment the manager informed us that previously there had been twenty-five operations to complete a pair of trousers, but now there were seventy-five; that under the old system there were about fifty separate operations in the

making of a coat, but that under "Scientific Management" this had been increased to one hundred and fifty. Even in the pressing of the clothes, the pressers no longer pressed an entire suit, but only some of the parts.

Going through one large establishment we stopped before a girl who was taking threads previously cut to a certain length, threading these into a needle, and then waxing the thread. The firm's expert informed us that previous to the installation of "Scientific Management' 'each girl had threaded her own needle, cutting off the threads in lengths to suit herself.

The methods of "Scientific Management," however, had shown this to be all wrong, for if a girl cut the threads too short she had to thread her needle to often, which was a waste of time, while if she cut the thread too long, she lost much time taking the long draws necessary until the thread became shorter. The girls sewing on buttons were, therefore, given different lengths of thread, and a careful record was kept of the number of buttons each girl sewed on per day, and when the length of thread which enabled the girls to sew on the largest number of buttons per day was secured through analyzing the results, this length of thread was made the standard. Based on the theory that a girl trained to thread needles could do this more efficiently than anyone else, one girl spent much of her time threading needles with the standard length of thread, this being one subdivision of the trade of sewing on buttons.

However, from a "scientific" standpoint, this was but a clumsy and slipshod result of an analysis of the "sewing on of buttons" trade, as we soon discovered, for in another garment making establishment they had studied this trade with a more searching spirit. If the length of thread with which the needle was threaded determined the number of buttons a girl could sew on in a day, then the length of her arms would also be a factor, for the girl with long arms would take a longer draw after putting the needle through the cloth and the button than the girl with short arms.

Once this "scientific" fact was discovered the experts made elaborate studies of the problem, girls with short, medium or long arms working with standard lengths of thread, being watched and the results of their day's output analyzed. As a result of these studies it was possible for the experts to discover the proper length of arm to enable a girl to sew on the largest number of buttons, and the employing department was instructed to supply the button sewing department with girls whose arms were of the desired length. But even this was not scientifically thoroughgoing, for it was found that the length of the fingers undoubtedly had an influence, and studies were made to determine what the most efficient length of fingers was, so that the girls in this department who were being specialized as button sewers would all have fingers and arms of the same length. So in time the firm had a group of girls sewing on buttons, with standardized lengths of thread, with their standard fingers and arms.

Here was the perfection of "Scientific Management!"

But human nature or human qualities and characteristics are prone to upset the rigid rules of mechanical motions when these are applied to them.

It was not long before the experts, who had studied for many weary days with stop watches and pondered deeply over huge masses of the time studies they had accumulated, discovered that though they had standardized the length of thread and the length of fingers and arms which were to sew on buttons with the thread, there was still a wide difference between the girls' output.

What the efficiency experts had failed to standardize, what as a matter of fact they could not standardize, were the physical and mental qualities of the workers, their vitality, their ambitions, their nervous co-ordination,

their ability to work without physical, nervous and mental deterioration under the monotonous character of their work.

In the end, in the latter plant, standard lengths of thread, or of fingers, or of arms, were discarded, and each girl was permitted to cut the length of the thread to suit herself, with the result that the unstandardized girls were apparently enjoying better health, were less rushed, and were doing better for themselves and their employers than their standardized sisters.

There may have been a modicum of scientific research, coupled with other objects, which led to the original time and motion studies resulting in the standardizing of the lengths of thread, fingers and arms in the trade of sewing on buttons, but the welfare of the girls, the desire to teach them to become competent garment workers, was certainly not the prime motive.

A result of this specializing and subdividing of the work is the employment of workers of less craft knowledge and narrower manual skill, who for lower earnings replace the skilled workmen. One instance came under our observation where skilled workmen who had been employed for years by the firm and whose earnings were from thirty dollars per week upwards were replaced by girls and women whose wages were less than half of that amount. These female workers each completed but a small part of the finished whole.

The extensive specialization which occurs could be illustrated by a barber shop where one worker would attend to the hot water, another work up the lather, a third apply it to the face, a fourth do the shaving, a fifth the stropping of the razor, while still others would respectively wash, dry and perfume the shavee's face. It is true that each of these workers might be termed a highly trained specialist, but such a narrow degree of craft or industrial knowledge would be of little practical value to him, to the community, or to the industries.

The detailed observations of the workers' motions while at work, known as motion study, are carried on for two principle purposes.

The highly skilled workers are closely observed so that their manual motions and method of laying out and handling their work may be studied until a record of the most efficient method of doing each minute part of the job can be secured and analyzed.

The best way to pick up a tool, to use it, to handle the material and prepare it for the finished product, are determined by the time and motion study man and recorded. This enables him later on to take the work formerly requiring skilled workmen and sub-divide it, giving the doing of one part of the job to one worker and another to someone else taken from the ranks of the lesser paid and taught to do the simple parts of the job to which they were assigned.

Through this careful study of every motion and method used by the skilled worker and its recording upon index cards, the employer in time acquires as personal property the craftsman's skill and knowledge, and then doles this out to the lesser skilled and lower paid workers, who are then employed to supplant the skilled craftsmen formerly required.

This practice raises a most serious problem relative to which the Hoxie report says:

"There can be little doubt that 'Scientific Management' tends in practice to weaken the power of the individual worker as against the employer, setting aside all questions of personal attitude and the particular opportunities and methods for voicing complaints and enforcing demands. As we have seen, it gathers up and transfers to the management the traditional craft knowledge and transmits this again to the workers only piece-meal as it is needed in the performance of the particular job or task. It tends in practice to confine each worker to a particular task or small cycle of tasks. It thus narrows his outlook and skill and the experience and training which are necessary to do the work. He is therefore easier of dis-

placement. Moreover, the changing of methods and conditions of work and the setting of tasks by time-study with its assumption always of scientific accuracy put the individual worker at a disadvantage in any attempt to question the justice of the demands made upon him, and the assumed payment of wages in proportion to efficiency with the opportunities of exceptional reward held out if he will but make the task, tend to put upon him responsibility for wage results of which he complains. There are no simple, definite, recognized and permanent standards of work and earnings to which he can appeal. The onus of proof is upon him and the standards of judgment are set up by the employer, covered by the mantle of scientific accuracy. The unskilled worker, especially, under 'Scientific Management,' loses what little chance of success as an individual he may elsewhere have, in any contest with the employer, and 'Scientific Management,' from the standpoint of competitive power, tends to relegate workers to the condition of the unskilled."

In addition to the gathering up of the craftsman's skill and transferring it to the employer's indexed records, motion study in practice is applied in instructing the worker so that no unnecessary motions will be made in connection with the work. The instructor with the motion study records at his disposal, plus the untrained worker, is expected to take the craftsman's place.

If the form of specialization which was found in operation in the great majority of plants visited could be applied to our industries as a whole, craft skill and knowledge among the workmen would disappear. The craft knowledge would become the employer's property in the same degree that his machinery is something personally owned, craft skill would also be the employer's possession, that particular part required for the performance of the work being given to the worker by instructors. The workers would have neither knowledge nor skill except that small and limited part which would be required to accomplish the simple portion of the work to which they were assigned.

The manager of one large establishment informed us that owing to the degree of specialization he had carried out it was possible for him to take untrained workers and instruct them so that in ten or fifteen days they could do the most of the work in the plant. Others informed us that in a month or two, under their system, they could make fully competent operatives for the work in their establishments. In a word, the specialization and standardization of labor under "Scientific Management" as we found it, provides no apprenticeship system for the training of craftsmen and assumes that the thoroughly trained mechanic is no longer required except in rare instances. It aims to replace the trained craftsmen with workers whose knowledge is limited to a few simple operations, and whose labor is directed by instructors.

If generally applied the craftsmen would pass out of existence, and the workers would become dependent for their existence upon the scanty and insignificant industrial knowledge and experience afforded them by their limited opportunities, regulated by those who, in addition to ownership of machinery, had also acquired possession of craft knowledge and the skilled workers' methods.

Over-Speeding.

One of the strongly defended claims of "Scientific Management" is that it prevents the workers from being overspeeded. Mr. F. W. Taylor held that:

"'Scientific Management' seeks to eliminate over-stimulation, over-speeding, and nervous and physical exhaustion of the workers:

By substituting exact knowledge based upon a careful study of men and machines for guess work in the setting of the task, and the determination of the hours and other conditions of work.

By eliminating thus the need for the employment of pace-makers.

By transferring from the workers to the management responsibility for contriving the best methods of work.

By removing from each worker responsibility for the work of others, and for the instruction of beginners and helpers.

By maintaining the best conditions for performing the work through furnishing the best tools and materials at the proper time and place.

By training the workers in the most economical and the easiest method of performing operations.

By standardizing equipment and performance.

By instituting rational rest periods and modes of recreation during working hours.

By surrounding the workers with the safest and most sanitary shop environments."

As found in practice, "Scientific Management" presented a wide range of conditions from which to draw conclusions as to the claim that under this system over-speeding is prevented.

In no instance was it found that the philosophy of the shorter work day had influenced any efficiency engineer or employer to reduce the hours of labor, while one of the leaders of "Scientific Management" informed us that the workers could be employed ten or twelve hours per day without any physical injury resulting.

In one or two plants systematic efforts had been made to prevent over-speeding, workers were advised not to endeavor to accomplish more than the task, and in one instance as a deterrent workers were penalized through a sharp reduction in the sum allowed for the completion of the job. In general, however, the workers were encouraged to beat the task, through both the employer's policy and the foreman's efforts to secure their bonus, the winning of which depended upon the workers achieving the tasks.

Reference to what appears under the head of "Time and Motion Studies" will indicate the unscientific, irregular character of much of the task setting, and the various influences which animate the task setter while engaged in his work. The reward received for reducing the cost of production, the employers' desire for speedy results, the temptation to make a better record than some other efficiency engineer or task setter, these and other motives operate to set the tasks so high that over-exertion is necessary to accomplish them in many instances.

Nowhere was it found that fatigue studies had been made, which would be of value. In fact, no scientific study has yet been made of the subject of fatigue, or of the workers' long-time efficiency, and as no comprehensive studies of human fatigue have been made by scientists, there is no data upon the subject which would warrant anyone's speaking upon it with authority. But even if there were, the important questions would be the manner in which the knowledge of the subject would be applied to the workers, and the degree to which it would safeguard them from over-strain. Upon this subject the Hoxie report says:

"A much more definite issue is brought up by Mr. Taylor's claim that 'Scientific Management' guards the workers against over-speeding and exhaustion through careful studies of fatigue and the setting of the task on the basis of a large number of performances by men of different capacities and with due and scientific allowance for the human factor and legitimate delays. It has been pointed out already in the discussion of time study that tasks are set in all sorts of ways, with reference to the men chosen and the number of performances timed. There is no general rule. And it was also demonstrated that no scientific method had been developed for the making of human allowances, and that these are sometimes very liberal, but sometimes also unduly curtailed. It must be admitted on the other hand that 'Scientific Management' can and often does go far through the study of machinery and the careful observation of the on-going process of production toward the establishment of proper allowance for legitimate delays, not connected directly with the human factor. When we come, however, to the matter of fatigue studies, and their connection with speeding and exhaustion, Mr. Taylor's claim seems to break down completely. No actual fatigue studies were found taking place in the shops, and the time study men employed, who should be charged with such studies, seemed, in general, to be quite indifferent or quite ignorant in regard to this whole matter. Fatigue studies apparently are not made when the tasks are set, and, if

afterwards complaint is made, the classical method of dealing with the subject is to 'demonstrate' to the worker that the task can be done in the time set. Efforts to discover from 'Scientific Management' experts proper methods for studying fatigue brought out only vague replies. Were it not for certain examples cited in 'Scientific Management' texts, there would seem to be no ground for crediting it with any scientific aspirations in this connection. This does not mean that no attention to fatigue is given in 'Scientific Management' shops. Cases were found where the health and energy of the workers were carefully observed and attempts were made to adapt the work to their condition, but the methods employed were the rough and ready ones of common sense observation."

While it is true that some efficiency engineers and employers have taken the element of fatigue into consideration with the object of preventing the worker's over-exertion, it is equally as true that others aim to develop a system which will spur the workers to their limit. The speed competition attitude on the workers' part is developed through many clever methods. In one plant the workers were divided into small groups, each group having a high post near it upon which two large signs were hung, one showing the number of pieces the group must finish during the day to complete their task and the other the degree of progress they had made. These signs were so prominent that the workers in one group could see the figures upon all of the other signposts in the room. From time to time the speed bosses went from group to group, counting up the finished pieces, and then posting the total finished work, so that the several groups could race with each other, or, what really was the case, realize that they were pitted against each other. It is but natural to anticipate that under this method the several foremen would vie with each other and endeavor to have the workers under them the speediest, for the resulting favor from the office which this would bring. One efficiency expert was quite frank upon this phase of the subject, and in writing about the atmosphere of speeding up which had developed, he said, with reference to a molder working under his system:

"This same man asked to be told a day before the pattern went out of the sand, so that he and his gang could put up a record that no other gang could touch."

One instance showing the extent to which "efficiency experts" can develop methods of speeding the workers up to their physical and nervous limit made a permanent impression upon the investigators.

The plant employed the usual forms of time and motion study for the determination of what the task should be, and the workers were paid a bonus if they accomplished the task. For example, if the time set upon a task was one hour, the worker, if he finished the job in an hour, was credited with an hour and a quarter's pay, based upon his hourly wage rate; so that if this was 20 cents, he would receive 25 cents for the hour's work.

This bonus was not considered sufficient to properly assist and stimulate the workers, so the foreman was also paid a bonus, this being based upon the number of workers under his charge who earned their full bonus. For the foreman's efficiency to reach 100 per cent it would be necessary for every worker in his gang to earn their bonus every hour of the working day. It was, therefore, to the foreman's interest to do all that lay in his power to see that every worker accomplished the task which had been set.

However, this was but a part of the scheme or system which aimed to get all of the work possible out of the workers, for another factor entered largely into the plan. The time study man and task setter was also paid a bonus which was based upon the number of workers who failed to make their tasks, the task setter's efficiency reaching 100 per cent only when every worker in a group failed to finish their jobs in the time set for the accomplishment of

their tasks. The time study man was, therefore, paid a bonus to set the tasks so high that the workers could rarely, if ever, accomplish them, while the foreman was paid a bonus based upon the number of workers who could be prevailed upon to finish their jobs within the time set.

Under this system there were no rest periods or other provisions which would prevent the workers from being speeded up to their limit, but instead it became a contest between the time-study man and the foreman, the one depending, for his extra wages, upon setting the time so short for the finishing of the task that the workers could not make it, and the other only receiving his bonus when he succeeded in having the workers accomplish these tasks. It was a clear case of playing both ends against the middle, the middle in this case being the unfortunate worker.

In theory "Scientific Management" would protect the worker from overexertion; in such an instance as the one just referred to the practical application of the system deliberately and with human ingeniousness aimed to secure the worker's last ounce of energy.

Even where the system did not aim to drive the workers to extreme exertion there was frequently a total absence of any provision to allow the workers a rest or breathing spell. In one plant the workers had requested that they be allowed rest periods, and this had been denied. Some of the workers, desiring rest periods, had hurried up their work so that a few minutes of rest would be secured between tasks. The firm had notified the workers that this practice must cease, but the workers had persisted and their determination was so evident that they were finally allowed to take rest moments. In this plant, which was operated by a man of high ideals in many ways, a condition was found in one department where, because of gang production, and the interruption in the gang process caused when one worker stopped, the women workers were practically unable to attend to human necessities during working hours. It is but fair to say that the general manager would not have tolerated the existence of such a condition had he known of it, for at heart he was a humanitarian. However, one of the very serious defects of "Scientific Management" is that it does not keep the manager informed of much that affects the workers, their rights, their welfare, and their desires.

Cumulative evidence was acquired during the investigation to prove labor's contention that "Scientific Management" in operation tends to speed up, that in many instances workers under this system have been speeded up to their physical limit, and that as applied by many it is intended to accomplish this result.

Industrial Democracy.

The controversy which centers about time study, task setting and the methods of payment employed by "Scientific Management" is perhaps of secondary importance to the attitude of "Scientific Management" towards industrial democracy and its relation to the workers.

Mr. Taylor has claimed that:

"'Scientific Management' is the essence of industrial democracy. It substitutes the rule of law for arbitrary decisions of foremen, employers and the unions and treats each worker as an independent personality; it transfers to the workers the traditional craft knowledge which is being lost and destroyed under current industrial methods; lessens the rigors of shop discipline; promotes a friendly feeling and relation between the management and the men, and among the workers of a shop or group; it gives a voice to both parties—to the workers in the end equal voice with the employer—and substitutes joint obedience to fact and laws for obedience to personal authority. No such democracy has ever existed in industries before.

Every protest of every workman must be handled by those on the management side and the right or wrong of the complaint must be settled, not by the opinion of either of the management or the workman, but by the great code of

laws which have been developed and which must satisfy both sides; both can refer only to the arbitrament of science and fact. 'Scientific Management' thus makes collective bargainings and trades unionism unnecessary as a means of protection to the workers, but it welcomes the co-opertaion of unionism."

Organized labor has declared that "Scientific Management" is essentially autocratic, a reversion to industrial autocracy which forces the workers to depend upon the employer's conception of fairness and justice and limits the democratic safeguards of the workers, that it tends to gather up and to transfer to the management all the traditional knowledge, the judgment and the skill of the workers, and monopolizes their initiative and skill in connection with work; that it ordinarily allows the workmen no voice in hiring or discharging, the setting of the task, the determination of the wages or the general conditions of employment; that it greatly intensifies unnecessary managerial dictation and discipline; tends to prevent the presentation and denies the adequate consideration of grievances and tends to increase the number of shop offenses and the amount of docking and fining; it introduces the spirit of mutual suspicion and contest among the men and thus destroys the solidarity and co-operative spirit of the group; it has refused to deal with the workers except as individuals; it is incompatible with and destructive to unionism; it destroys all the protective rules established by unionism; and, finally, it is incompatible with and destructive to collective bargaining.

Industrial democracy, as we understand it, is that condition in the industries which acknowledges and accepts the right of labor to a collective voice in determining what the terms of employment shall be, and the conditions under which labor is to be performed. It gives practical application to the principle that government in the shop, like government in the nation, should be by the consent of the governed.

It has not been my purpose to discuss the theory of "Scientific Management" as expounded by its leaders, but rather to call attention to the conditions affecting labor which were found to exist in plants where "Scientific Management" had been installed. It is essential, however, that attention should be called to industrial democracy as it is apparently understood and defined by those who apply the principles of "Scientific Management," for, unless this is done, it would be impossible to understand the attitude which "Scientific Management" has assumed towards labor.

Mr. Taylor has held that the relations between employers and workers are governed by a fundamental harmony of interests. Assuming this to be true and that perfect equality of interests exists between them, complete democracy in all of their relations is to be secured by setting aside the employers' personal authority, and the arbitrary rules and regulations of the workers, with all of the machinery for negotiations and the enforcements of decisions created by both, and substituting at all times the impersonal dictates of natural law and fact. It is the democracy of science as applied to industry. All that is necessary to realize this is to have in the shop a corps of scientists to determine and declare to employers and workers the objective scientific facts.

"If," as the Hoxie report says, "Mr Taylor's original assumption is correct, and if all industrial matters touching the relations of employers and workmen have been or can be reduced to a purely scientific basis his conception of industrial democracy is valid, and if it is adhered to by scientific managers generally, the worker has no need of unions, union machinery or collective bargaining to voice his complaints and enforce his demands in order to secure just consideration of his interests and equal voice with the employers in the determination of all matters of mutual concern."

However, as a matter of fact, neither is the Taylor assumption correct, nor is it adhered to by scientific managers generally.

Theoretically, Mr. Taylor and other leaders of "Scientific Management" hold that the elements of the conditions of labor and the terms of employment can be demonstrated as objective scientific facts and are, therefore, no more subject to bargaining or arbitration than the question of the earth's revolution on its axis or the principles of arithmetic. Perhaps no feature of "Scientific Management" indicates a wider divergence between a theory and its application than the one under consideration. As one efficiency expert said to me, after spending some time with him in investigating a plant where he had assisted in introducing the system: "All of this talk about 'Scientific Management' benefiting labor is b——. We have to use it for policy's sake. The employers are after the results, and what ——— and I are after is the money, for the financial results are the first consideration. When ——— undertakes to introduce the system in a plant, he makes the first studies and gives the foremen the first instructions, and this frequently makes trouble, and then I am brought in as a pacifier or soft-soaper to follow up ——— and sling the salve. After this I take up the work of rate making and task setting."

This attitude was not exceptional, although it was sometimes expressed in choicer language. As one of the leading manufacturers said to us, "——— is a thinking machine of high order, and the system which he worked out is all right so long as he is not given any chance to apply it himself."

In one well known establishment, Mr. Hoxie said to the manager: "Your conception of industrial democracy is the employer sitting as a just judge and handing down his opinion, based upon the facts and arguments presented to him." The reply was: "To a certain extent." Mr. Hoxie added: "Then the final decision must rest with someone who is not biased," and the reply was, "Not necessarily, but it must rest with someone who is not biased and who is in authority."

This manager held that the question of fatigue, the difficulty of accomplishing the task, was not a matter for bargaining or for negotiation with the employer, but was a matter for scientific determination. He believed that the minimum wage rate was also a matter for scientific determination, as well as the hours for labor, yet in this plant, where the tasks were set under the system, the workers who did not accomplish them were penalized by being demoted to a lower hourly wage rate, and the worker who did not fall into line with the many rules set up was disciplined in other ways, or eliminated.

Mr. Taylor's ideal shops with their corps of scientists, and scientifically trained time-study men and instructors were not encountered during the investigation. It is true that systems of "Scientific Management" had been installed by efficiency engineers possessed of marked ability and wide experience, men of high ideals and not wanting in the milk of human kindness, but these men did not remain in charge of the plant to direct the machinery which they had installed, and this work was taken up by other and inferior men. It is the work of the time study men which chiefly determines whether efficiency shall be combined with just and humane treatment of the workers, regardful of their present and future welfare.

"This being true," says the Hoxie report, "the time-study man is, from the standpoint of labor, the central figure in 'Scientific Management,'—its vital organ and force. To perform his functions properly, to make 'Scientific Management' tolerable to labor, he must

be a man exceptional in technical and industrail training, a man with a broad and sympathetic understanding of the workers as well as of the economic and social forces which condition their welfare, a man of unimpeachable judgment, governed by scientific rather than pecuniary considerations, and, withal, he must occupy a high and authoritative position in the management. For if he is to set tasks that will not cause nervous and physical exhaustion, he must not only have an intimate personal knowledge of the work to be done, the special difficulties it involves, the qualities required to do it well, the demand which it makes on strength, skill, ingenuity and nervous force, but he must also be able to recognize and measure nervous disturbance and fatigue and understand and deal wisely with temperament. If he is to set tasks that will always be fair and liberal, he must understand and know how to discount all the effects of current variations in machinery, tools and materials, in human energy and attention. If he is to safeguard the lives and health of the workers and their general economic and social welfare, he must be an expert in matters of sanitation and safety, and have a broad and deep understanding of economic and social problems and forces, and, finally, if he is to make all this knowledge count, he must be able to establish the standards warranted by his study and judicial weighing of men and facts, and to protect these standards against infringement and displacement. All this and more, if the claims of 'Scientific Management' relative to labor are to be generally fulfilled.

But as things actually are, this emphatically is not the type of man who is habitually engaged in time-study work, and who is being drawn into it, nor does the time-study man of the present occupy this exalted position in the hierarchy of 'Scientific Management.' The best men in this work are perhaps technically qualified, but so far as the observation of your investigator has gone, the best of them are technicians with little knowledge of the subject of fatigue, little understanding of psychology and temperament, little understanding of the viewpoint and problems of the workers, and almost altogether lacking in knowledge of and interest in the broader economic and social aspects of working-class welfare. The bulk of the time-study men encountered were immature men drawn from the shop or from college. They were expected to get their knowledge and training in all the matters enumerated above through the actual work of time-study and task-setting. In the majority of cases encountered it was not considered essential that they should have had any special training in the particular industry. A man who had worked exclusively in the machine shop was considered competent, after a few weeks or months of contact and trial experience, to set tasks in a cotton mill. Sometimes previous industrial experience of any kind was not considered necessary. Analytical ability, good powers of observation, a sense of justice and tact were the chief qualities emphasized as essential for a good time-study man. Rarely, if ever, was anything said of technical knowledge concerning fatigue, psychology, sanitation, safety, and in broader problems of industrial and social welfare. Indeed, time-study and task-setting were almost universally looked upon as primarily mechanical tasks in which the ability to analyze jobs and manipulate figures rather than broad knowledge and sound judgment were regarded as the essential factors. Naturally, therefore, the time-study men were found to be prevailingly of the narrow-minded mechanical type, poorly paid and occupying the lowest positions in the managerial organization, if they could be said to belong at all to the managerial group. Nor does the situation seem to promise much improvement. For the position and pay accorded to time-study men generally, are such as to preclude the drawing into this work of really competent men in the broader sense. Aside from a few notable exceptions in the shops, and some men who make a general profession of time-study in connection with the installation of 'Scientific Management' this theoretically important functionary receives little more than good mechanic's wages, and has little voice in determining shop policies. The start is often made at $15.00 per week. A good time-study man, according to current standards, can be had at from $75 to $100 a month, and $125 per month is rather high rating for experienced men, if the statements of scientific managers are to be trusted. In fact, the time-study man, who, if 'Scientific Management' is to make good the most important of its labor claims, should be among the most highly trained and influential officials in the shop, a scientist in viewpoint, a wise arbiter between employer and workmen, is, in general, a

petty functionary, a specialist workman, a sort of clerk, who has no voice in the counsels of the higher officials. There are, of course, exceptions to this general rule, but taking the situation as a whole, the quality of the time-study men actually setting the tasks in 'Scientific Management' shops and the position which they occupy are such as to preclude any present possibility of the fulfillment of its labor claims."

There can be little doubt that "Scientific Management" as we found it applied, tends to weaken the power of the individual worker, as against the employer, setting aside all questions of personal attitude and the particular opportunity and methods for voicing the workers' complaints and enforcing their demands. It tends in practice to confine each worker to a particular task or operation, or the most limited number of these. It narrows the worker's outlook and limits his opportunity of acquiring skill and knowledge through experience, and limits his growth towrads craftsmanship. The worker is, therefore, easier to displace. Personal interviews with workers brought to light many instances of pressure, indicating how difficult, if not impossible, it was for them to act collectively under the systems. The individual workers were reluctant to call attention to work which had been poorly done by other workers, because it gave them the reputation of being cranks or fault-finders among the workers of their own and other groups, and made them objects of unwelcomed attention on the part of the instructors, gang bosses, speed bosses and time-study men. Most of the workers interviewed seemed to feel themselves helpless in the face of the machinery which the system had built up, and each one was endeavoring to protect himself only. Frequently the worker who is timed on the job is a pace maker, and consciously such, which creates an attitude on the part of his fellow workers which can be readily understood. Where the task is set too high, the workers complain that their predecessors skimp the work in their efforts to earn their bonus, and that much of this skimped work passes the inspectors during the process of production. Neither is favoritism eliminated, this being particularly true where the foreman is paid a bonus on the work done under him. A source of irritation was also found in the sudden jump in rates which takes place under some of these systems when the task has been accomplished. The worker who just misses the mark, and, therefore, loses his bonus, feels irritated when he sees other workers attaining their bonus, through some favoring circumstances or because they have succeeded in evading the inspector's vigilance, or because the time studies have not been thorough enough to make proper allowance for difference in the skill required or the materials used on the job.

Dealing with this subject the Hoxie report says:

"Beyond the question of irritation is that of the general effect of 'Scientific Management' methods on the motives and attitudes of the workers. Here the count seems to be decidedly in favor of the trade-union charges. Almost everything points to the strengthening of the individualistic motive and the weakening of group solidarity. Each worker is bent on the attainment of his individual task. He cannot combine with his fellows to determine how much that task shall be. If the individual slows down, he merely lessens his wages and prejudices his standing without helping his neighbor. If he can beat the other fellow, he helps himself without affecting the other's task or pay. Assistance, unless the man is a paid instructor, is at personal cost. Special rewards, where offered, are for the individual. The chance of promotion is supposed to depend on the individual record. Rules of seniority are not recognized. Sometimes, personal rivalry is stimulated by the posting of individual records or classification of the workers by name into Excellent, Good, Poor, etc. Potential groups are broken up by the constant changes in methods and re-classification of workers which is the mission of time-study. The whole gospel of 'Scientific Management' to the worker is to the individual, telling him how, by special efficiency, he can cut loose from

the mass, and rise in wages and position to a man of consequence. Only by the welfare work outside the working hours is there anything done to bring the men together. But once seated at the bench or machine, they are so many individual atoms, each dependent on his own exertions for the position he shall occupy in the heap. Decidedly, then, 'Scientific Management' does not tend to the development of group solidarity within the shop.

With the power of the individual weakened, and the chances lessened for the development of groups and group solidarity, the democratic possibilities of 'Scientific Management,' barring the presence of unionism, would seem to be scant. The individual is manifestly in no position to cope with the employer on a basis of equality. Collective bargaining directly by the men employed is, under the circumstances, almost unthinkable. Unless, then, 'Scientific Management' has evolved and put into practice something to offset this manifest weakness of the individual and the shop group in their dealings with the employers, or holds itself ready to co-operate with unions outside, it cannot by any stretch of the imagination be called democratic."

We were almost invariably informed that the workers had every opportunity of having their complaints or grievances fully considered and adjusted, and that the door to the general manager's office was always open to the workers who had failed to receive satisfaction from those holding subordinate managerial positions, but when efforts were made to discover how many workers have availed themselves of this privilege, the number was found to be practically zero.

General Labor Problems Arising from the Introduction of "Scientific Management."

Under this heading the Hoxie Report brings together the results of the whole investigation in regard to the general effects and tendencies of "Scientific Management" relative to labor. It is, therefore, the clearest and most concise statement that can be made. As the work on this section was submitted paragraph by paragraph to the experts, and it was modified by them in the process of making, it is in the nature of a joint product. On both accounts I feel justified in making my statement a condensation of this section.

Probably no one will dispute the statement that "Scientific Management" at its best greatly accelerates the modern tendency towards specialization of the workers. An example of this is afforded by the work of the machine operator, whose machine is not largely of the semi-automatic or automatic type.

Under the ordinary form of management found in industries, the machine operator is something more than a mere feeder of material into a machine, for he performs manual and mental labor as the result of his craft knowledge and skill, which is as essential to complete the product as is the work done by the machine. In addition to being a machine operator, he cares for the machine, corrects and repairs minor accidents, makes necessary adjustments, attends to the belting and grinds his own tools. He exercises also, within reasonable limits, and where there is a call for his initiative and dependence upon his craft knowledge, individual judgment in the laying out and setting up of a job, and in determining the method and the feed and speed to be employed in running the material through. Under "Scientific Management," on the other hand, in its fullest development, this same workman becomes a mere machine tender. All the extra work is done for him by a series of functional foremen or specialist workmen. The belting connected with the machine is cared for by a special functionary, the belt man; the tools which he uses are brought to him already ground by a specialist who does nothing else; his materials are always at hand, delivered by the move man, who also takes away the product. The laying out and setting up of the work, the feed and speed to be used in doing it, and the mode of handling the material and putting it through the machine are determined by special func-

tionaries and embodied in written instructions, except where the functional foreman is actually present to perform or assist in the initial operation or where the work is so thoroughly subdivided and repetitive that actual instructions are not deemed necessary, and though the worker may depart in some instances from the instructions given, he does so at the peril of the bonus, premium or higher differential piece rate. Under the system fully developed, he is intended to be, and is, in fact, a machine feeder and a machine feeder only, with the possibility of auxiliary operations clearly cut off and with means applied to discourage experimentation. What applies to the machine feeder applies with more or less thoroughness to machine and hand operatives generally. Functional foremanship brings the managerial activity into every phase of the shop work. As Mr. Taylor says: "It effects a more equal division of the work between the management and the men by taking from the latter many of the activities which they were formerly obliged to perform."

But it is not merely in stripping from the job its auxiliary operations that "Scientific Management" tends to specialize the work and the workmen. Time study, the chief corner stone of all systems of "Scientific Management," tends inherently to the narrowing of the job or task itself. The chief function of time study is the analysis of work, the reduction of operations to their elementary motions and units, and the recombination of these elements into operations more quickly and easily performed. Doubtless time study thus may sometimes result in the discovery that new elements or operations may be added to former jobs with a distinct contribution to efficiency and economy, or that former operations may be efficiently combined. But as the final object of time study, as far as it directly touches the workers, is to make possible the setting of tasks so simple and uniform and so free from possible causes of interruption and variation that definite and invariable time limits can be placed upon them, and the worker may be unimpeded in his efficient performance of them by the necessity for questioning and deliberation, the preponderating tendency of time study is to split up the work into smaller and simpler operations and tasks. This tendency is not always apparent in "Scientific Management" shops, because sometimes, especially where these represent an old established machine industry, the specialization of work has already been carried to the extreme possible with the machinery in use. But time study furthers the invention of new machinery of a more automatic type and of machinery for the performance of former hand operations. An interesting sidelight was thrown upon this whole matter in one shop visited where time study for standardization and improvement had been especially emphasized. Here former hand work has been progressively converted into machine work, and the cycle of many operations in the particular job had become so short that the management has been unable to catch them accurately by means of the stop watch, and so despaired of being able to set tasks by means of elementary time study. Decidedly, then, time study tends to further the modern tendency toward specialization of the job and the task.

The inherent tendency to specialization is buttressed, broadened in its scope and perpetuated by the progressive gathering up and systematizing in the hands of the employers of all the traditional craft knowledge in the possession of the workers. With this information in hand, and functional foremanship to direct its use, "Scientific Management" claims to have no need of craftsmen, in the old sense of the term, and, therefore, no need for an apprenticeship system except for the training of functional foremen. It, therefore, tends to neglect apprenticeship except

for the training of the few. And as this accumulation of systematized knowledge in the hands of the employers grows, they are enabled to broaden the scope of its operation, to attack and specialize new operations, new crafts and new industries, so that the tendency is to reduce more and more work to simple, specialized operations and more and more workers to the position of narrow specialists. Nor does "Scientific Management" afford anything in itself to check or offset this specialization tendency. The instruction and training offered is for specialist workmen. Selection and adaptation are specializing in their tendencies. Promotion is for the relatively few. The whole system, in its conception and operation, is pointed toward a universally specialized industrial regime.

The following editorial from a recent issue of THE INTERNATIONAL MOLDERS' JOURNAL attempts to describe the condition which is being created by "Scientific Management" as we found it in practice.

"MODERN INDUSTRY AND CRAFT SKILL."

"The one great asset of the wage worker has been his craftsmanship. We think of craftsmanship ordinarily as the ability to manipulate skilfully the tools and materials of craft or trade. But true craftsmanship is much more than this. The really essential element in it is not manual skill and dexterity but something stored up in the mind of the worker. This something is partly the intimate knowledge of the character and uses of the tools, materials and processes of the craft which tradition and experience have given the worker. But beyond this and above this, it is the knowledge which enables him to understand and overcome the constantly arising difficulties that grow out of variations, not only in the tools and materials but in the conditions under which the work must be done.

In the past, for the most part, the skilful manipulation of the tools and materials of a craft and this craftsmanship of the brain have been bound up together in the person of the worker and have been his possession. And it is this unique possession of craft knowledge and craft skill on the part of a body of wage workers—that is, their possession of these things and the employer's ignorance of them—that has enabled the workers to organize and force better terms from the employers. On this unique possession has depended more than on any other one factor the strength of trade-unionism and the ability of unions to improve the conditions of their members.

This being true, it is evident that the greatest blow that could be delivered against unionism and the organized workers would be the separation of craft knowledge from craft skill. For if the skilled use of tools could be secured from workmen apart from the craft knowledge which only years of experience can build up, the production of 'skilled workmen' from unskilled hands would be a matter in almost any craft of but a few days or weeks; any craft would be thrown open to the competition of an almost unlimited labor supply; the craftsmen in it would be practically at the mercy of the employer.

Of late, this separation of craft knowledge and craft skill has actually taken place in an ever widening area and with an ever increasing acceleration. Its process is shown in the two main forms which it has been taking. The first of these is the introduction of machinery and the standardization of tools, materials, product and process, which makes production possible on a large scale and the specialization of the workmen. Each workman under such circumstances needs and can exercise only a little craft knowledge and a little craft skill. But he is still a craftsman, though only a narrow one and subject to much competition from below. The second form, more insidious and more dangerous than the first, but to the significance of which most of us have not yet become aroused, is the gathering up of all this scattered craft knowledge, systematizing it and concentrating it in the hands of the employer and then doling it out again only in the form of minute instructions, giving to each worker only the knowledge needed for the mechanical performance of a particular relatively minute task. This process it is evident separates skill and knowledge even in their narrow relationship. When it is completed the worker is no longer a craftsman in any sense, but is an animated tool of the management. He has no need of special craft knowledge or craft skill, or any power to acquire them if he had, and any man who walks the street is a competitor for his job.

There is no body of skilled workmen today safe from the one or the other of these forces tending to deprive them of their unique craft knowledge and skill. Only what may be termed frontier trades are dependent now on all around craftsmen. These trades are likely at any time to be standardized and systematized and to fall under the influence of this double process of specialization. The problem thus raised is the greatest one which organized labor faces. For if we do not wish to see the American workman reduced to a great semi-skilled and perhaps little organized mass, a new mode of protection must be found for the working conditions and standards of living which unions have secured, and some means must be discovered of giving back to the worker what he is fast losing in the narrowing of the skill and the theft of his craft knowledge. It is another problem which the organized workmen must solve for themselves and for society.

Under these circumstances, the progressive degeneration of craftsmanship and the progressive degradation of skilled craftsmen seem inevitable."

In connection with the thoughts just expressed, I desire to submit another excerpt from the Hoxie report:

"'Scientific Management,'" it says, "would seem to offer possibilities ultimately of better market control or better adaptation to market conditions, but the experience of the past year of depression indicates that at present no such possibilities generally exist.

"Finally, until unionism as it exists has been done away with or has undergone essential modification, 'Scientific Management' cannot be said to make for the avoidance of strikes, and the establishment of industrial peace. Mr. Taylor's statement that no strike has ever occurred under 'Scientific Management' means simply that if a strike occurs, 'Scientific Management,' in Mr. Taylor's conception of it, does not exist. Your investigator has discovered several well authenticated cases of strikes which have occurred in 'Scientific Management' shops. He is inclined to believe that they are less frequent in this class of shops than elsewhere in similar establishments, owing largely to the fact that organized workmen are on the whole little employed. In its extension, however, it is certain that 'Scientific Management' is a constant menace to industrial peace. So long as present day unionism exists, and unionists continue to believe as they seem warranted in doing, that 'Scientific Management' means the destruction of their organizations or their present rules and regulations, unionism will continue to oppose it energetically and whenever and wherever opportunity affords."

Conclusions.

Our purpose has been to describe the conditions affecting labor which were found in manufacturing establishments where "Scientific Management" had been introduced rather than to discuss or attempt to analyze the theories of this new factor which is being introduced into the machinery of production. Our conclusions are drawn from evidence which was secured through personal observation of the investigators and the interviews which were held with efficiency experts, managers and shop men.

It is my opinion that the inequalities, variations and contradictions which were found in establishments applying "Scientific Management" were due:

1. To the employers' desire to apply just that portion of the theory and rules of "Scientific Management" which they deemed most advantageous to themselves.

2. To the desire to secure the fullest output of their plant by the shortest cut and the lowest immediate labor cost.

3. To the employer's personal viewpoint as to his relationship and duties to the workers in his employ.

4. To the extent to which the employer's knowledge of the laws governing production was balanced by a knowledge of the laws of economics and sociology.

5. To the extent to which the autocratic spirit is balanced by the employer's conception of industrial democracy in formulating shop rules and establishing the terms of employment and the conditions under which labor is to be performed.

In talking with the workers in "Scientific Management" shops we were in-

formed that the system tended to cause some workers to slight their work to the limit made possible by the degree of inspection which prevailed over them; that it tended to the passing of work which was a shade under the standard; that it tended to develop deliberate schemes to slight work on the part of some workers and often became a source of friction between workers, as the slighted work increased the labor of other workers.

Many of the workers interviewed held that "Scientific Management:"

1. Makes the workers over-exert themselves.
2. Creates shop jealousies.
3. Enables foremen, through collusion with the planning room, to play favorites.
4. Makes workers shirk work, leaving the task more difficult for those next in the line for the handling of the material.
5. Forces the high grade workmen to often bear a large part of the burden of experiments and to work out new material without any adequate remuneration.

The evidence would indicate that, aside from the determination of machine speeds and the cutting speed of tools, time study is largely a matter of the time-study man's personal judgment, for he determines:

1. How many time studies shall be made on the job.
2. When the time studies shall be made.
3. Whether the tools, the material and the equipment is in proper condition.
4. How many workers shall be timed on the job.
5. Who the workers shall be on whom time studies shall be made.
6. Whether they shall be the slowest, average or speediest workers.
7. What elementary times shall be thrown out; that is, the number of longest and shortest times which will be discarded from the record before the time to be accepted shall be computed from the figures which remain.

It was fully demonstrated that one object of "Scientific Management" was to specialize the work and divide it into the minutest subdivision possible, for the more thoroughly this was accomplished the more successfully the system could be operated from the employers' point of view and the shorter the period required to train new workers to perform the work.

Regardless of the form of payment, whether bonus, premium or differential piece work, or any variation of these methods, the purpose is to stimulate the workers to accomplish the task which has been set for them by the time-study men, or the planning room. Without this stimulus the employers feel that the workers would not accomplish the task.

In the majority of instances there were no safeguards established to protect the workers from over-exertion, but instead they were stimulated to work to the extent of their physical ability and instances were encountered where the methods applied aimed to secure the workers' limit of strength and exertion.

In the great majority of cases there was no system of training intended to develop young men into competent craftsmen, and in many instances the statement was made that the thoroughly trained mechanics or craftsmen were no longer required. Apprenticeship, except in one instance, had been wholly discontinued and in this establishment, employing hundreds of workers, but nine boys were being given an opportunity of learning a trade.

General manual skill was not being developed. The rule was to train workers in the use of but a few hand or machine tools. The workers were made familiar with the manual skill required to perform but a few of the operations necessary to complete the finished article.

Except for the skilled craftsmen re-

quired to perform work which as yet it has been impossible to subdivide, and which, therefore, required skill, long training and craft judgment to accomplish, it was the practically unanimous opinion of shop managers that workers possessed of wide craft knowledge were no longer required. In hiring workers they seek for those who are familiar with but a few hand tools, one process or machine.

It was apparent that under "Scientific Management" the workers were made dependent upon the functional foremen and the planning room for craft and mechanical knowledge required in the establishment:

1. Because the workers were trained to become "one job and one operation" men.

2. Because when leaving one "Scientific Management" shop in which they had received their training as workmen, they became practically unskilled labor, unless they could secure employment at their own subdivided and restricted specialty in some other shop.

3. Because a broad industrial training had been denied them.

It was evident that collective bargaining or negotiations relative to terms of employment and conditions of labor between employer and workers had been eliminated, as the employers arbitrarily determined:

1. All shop rules.

2. The rate of wage.

3. Whether labor should be paid by the bonus, premium, differential piece system, or some modification of these.

4. What should be the time allowed for the performance of a task, or the accomplishing of a so-called standard of efficiency.

5. What the hours of labor should be.

6. What industrial education should be given to the workers.

7. What method would be established by which the individual workers might receive a hearing.

8. What should be the basis of hiring and the grounds for discharge.

9. What facilities would be provided for performing the work.

10. That the workers should be dealth with as individuals, and that there should be no collective bargaining between the employers and workers to determine the terms of employment and the conditions of labor.

After Mr. Hoxie's report had been examined and endorsed by Mr. Robert Valentine and myself, a brief statement was prepared by the three who had participated in the investigation which contained the conclusions which they had jointly reached.

My statement will be brought to a close by quoting the following, from these joint conclusions:

"Two essential points stand forth. The first point is that 'Scientific Management,' at its best and adequately applied, exemplifies one of the advanced stages of the industrial revolution which began with the invention and introduction of machinery. Because of its youth and the necessary application of its principles to a competitive state of industry, it is in many respects crude, many of its devices are contradictory of its announced principles, and it is inadequately scientific. Nevertheless, it is to date the latest word in the sheer mechanics of production and inherently in line with the march of events.

"Our industries should adopt all methods which replace inaccuracy with accurate knowledge and which systematically operate to eliminate economic waste. 'Scientific Management' at its best has succeeded in creating an organic whole of the several departments of an institution establishing a co-ordination of their functions which had previously been impossible, and, in this respect, it has conferred great benefits on industry. The social problem created by 'Scientific Management' does not lie in this field. It is in its direct and indirect effects upon labor that controversy has arisen, and it was in this field that the investigation was principally made. For the present, the introducers and appliers of 'Scientific Management' have no influences to direct them, except where labor is thoroughly organized, other than their ideals, personal views, humanitarianism or sordid desire for immediate

profit with slight regard for labor's welfare.

"The second point is that neither organized nor unorganized labor finds in 'Scientific Management' any adequate protection to their standards of living, any progressive means for industrial education, or any opportunity for industrial democracy by which labor may create for itself a progressively efficient share in efficient management. And, therefore, as unorganized labor is totally unequipped to work for these human rights, it becomes doubly the duty of organized labor to work unceasingly and unswervingly for them, and, if necessary, to combat an industrial development which not only does not contain conditions favorable to their growth, but, in many respects, is hostile soil."